

## 1997 Chevrolet S10 Pickup

MANUAL TRANS OVERHAUL - NEW VENTURE 1500 (MW2) 1997 MANUAL TRANSMISSIONS New Venture 1500 (MW2) 5-Speed

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## IDENTIFICATION

Transmission identification code is stamped on left side of transmission at front and rear housing joint. Manufacturer identifies it as NV 1500. Manufacturer RPO code is MW2.

## LUBRICATION & ADJUSTMENTS

See TRANSMISSION SERVICING - M/T article in MANUAL TRANS SERVICE section.

## TROUBLE SHOOTING

See TROUBLE SHOOTING - BASIC PROCEDURES article in GENERAL TROUBLE SHOOTING section.

## ON-VEHICLE SERVICE

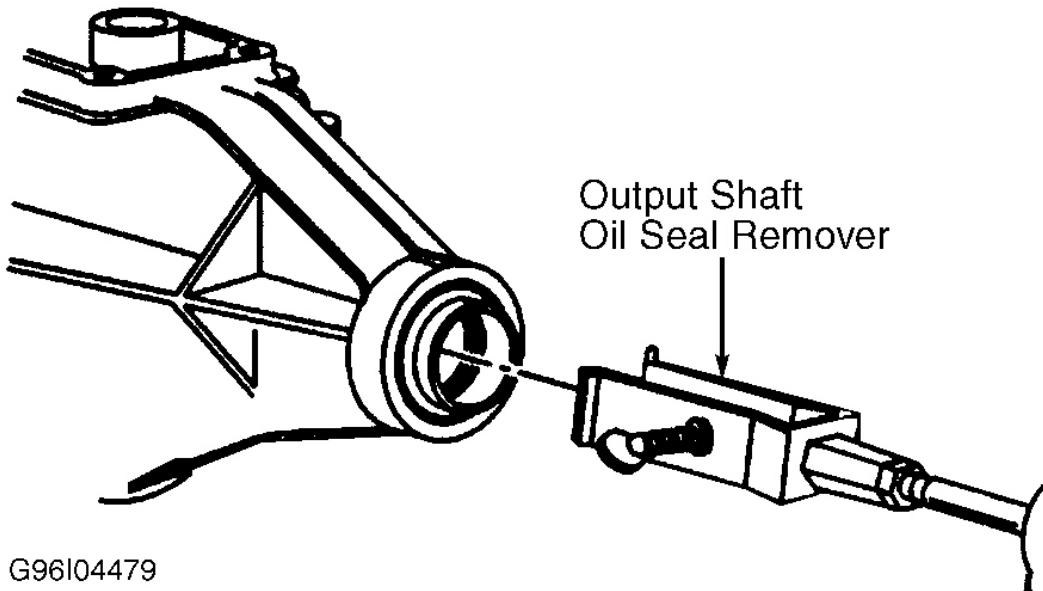
### REAR HOUSING OIL SEAL

#### Removal

Raise and support vehicle. Drain transmission fluid. Remove drive shaft. Use oil seal remover to remove oil seal. See Fig. 1.

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**Fig. 1: Removing Rear Oil Seal**

Courtesy of GENERAL MOTORS CORP.

### Installation

Apply sealant on outside area of NEW seal. Fill lip of oil seal with chassis grease. Install seal using appropriate oil seal installer. Install drive shaft. Tighten drive shaft bolts to specification. See **TORQUE SPECIFICATIONS**. Fill transmission and lower vehicle.

### VEHICLE SPEED SENSOR

#### Removal & Installation

Raise and support vehicle. Remove harness connector and bolt holding sensor in case. Remove vehicle speed sensor. Install NEW "O" ring onto speed sensor. Coat "O" ring with thin film of transmission fluid. Install speed sensor and bolt. Install harness connector.

### SHIFT LEVER

#### Removal & Installation

Remove 10 screws securing shift lever boot to floor panel and insulator. Loosen nut and unscrew shift lever from housing assembly. To install, reverse removal procedure. Ensure shift pattern on lever knob is horizontal.

### SHIFT LEVER HOUSING

**Removal & Installation**

Shift transmission into 3rd or 4th gear. Remove shift lever. When removing shift lever housing, remove 4 bolts at base of housing. See [Fig. 3](#). DO NOT remove bolts under boot located at top of shift lever housing. DO NOT disassemble shift lever housing. If housing requires repair, replace complete assembly. Internal components are not available from manufacturer. When installing shift lever housing, ensure transmission is in 3rd or 4th gear.

**REMOVAL & INSTALLATION**

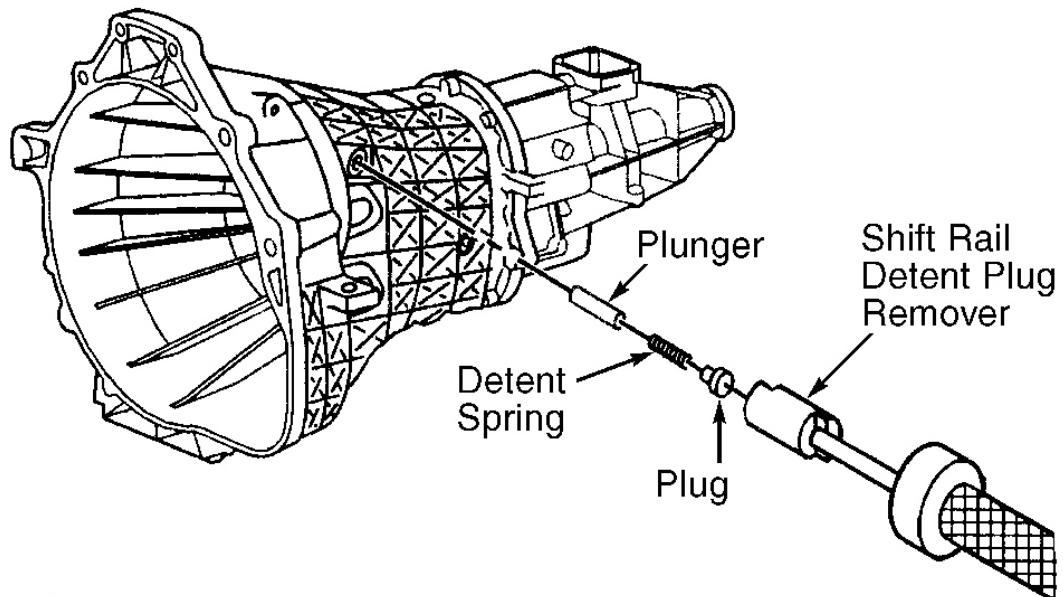
See [TRANSMISSION REMOVAL & INSTALLATION - M/T](#) article in MANUAL TRANS SERVICE section.

**TRANSMISSION DISASSEMBLY**

1. Remove 2 bolts securing idler shaft support and collar to rear housing. Remove back-up light switch and vehicle speed sensor. Remove shift rail block-out bushing bolt, located on top of front housing near breather assembly.
2. Using Detent Plug Remover (J-36509) and slide hammer, remove detent plug, spring and plunger from front housing. See [Fig. 2](#). Remove output shaft oil seal. With transmission in vertical position, remove input shaft bearing retainer. Remove snap ring. Position transmission horizontally and remove 9 front housing-to-rear housing bolts. See [Fig. 3](#).
3. Remove countershaft roller bearing from countershaft or bearing shell. Remove roll pin from shift lever. DO NOT lose plunger and spring. Support shift rail end while driving out shift lever roll pin. Using 3/16" (5 mm) punch and air gun, remove shift rail socket roll pin. DO NOT apply excessive force, or pin will peen shift rail and damage rear housing shift rail bushing.
4. Remove shift rail, shift rail socket, shift lever and shift rail block-out bushing. See [Fig. 3](#). Rotate 3rd-4th shift fork counterclockwise and remove shift fork.
5. Remove 5 bolts from center of rear housing securing output shaft bearing retainer. Remove rear housing from gear assemblies. Remove reverse idler gear and output shaft bearing retainer. Remove shift forks. Remove countershaft, countershaft bearing snap ring, and bearing. Press countershaft bearing off countershaft, if necessary. Remove output shaft assembly, input shaft and pilot bearing. See [Fig. 4](#).

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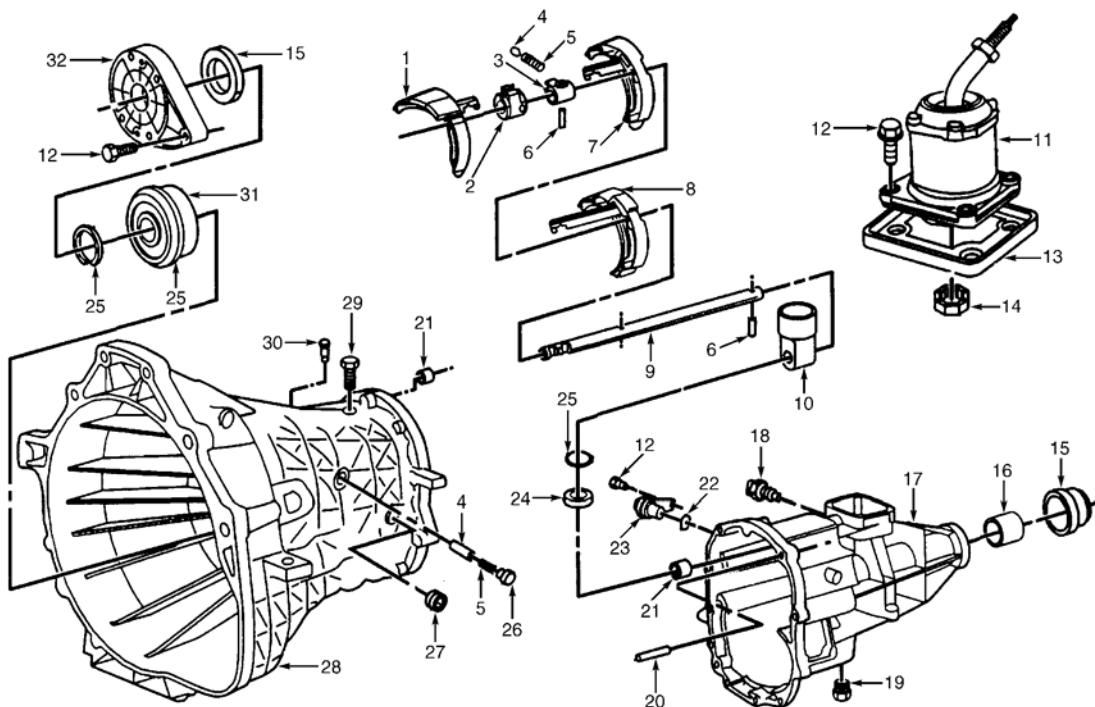
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**Fig. 2: Removing Detent Plug, Spring & Plunger**

Courtesy of GENERAL MOTORS CORP.

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1. 3rd-4th Shift Fork  
 2. Block-Out Bushing  
 3. Shift Lever  
 4. Detent Plunger  
 5. Detent Spring  
 6. Roll Pin  
 7. 1st-2nd Shift Fork  
 8. 5th-Reverse Shift Fork  
 9. Shift Rail  
 10. Shift Rail Socket  
 11. Shift Lever Housing Assembly

12. Bolt  
 13. Shift Lever Housing Seal  
 14. Lower Ball Isolator  
 15. Oil Seal  
 16. Extension Bushing  
 17. Rear Housing  
 18. Back-Up Light Switch  
 19. Oil Drain Plug  
 20. Dowel Pin  
 21. Shift Rail Bushing  
 22. "O" Ring

23. Speed Sensor  
 24. Support  
 25. Snap Ring  
 26. Plug  
 27. Oil Fill Plug  
 28. Front Housing  
 29. Block-Out Bushing Pin  
 30. Breather Assembly  
 31. Input Shaft Bearing  
 32. Bearing Retainer

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## Fig. 3: Identifying Transmission Shift Mechanism & Case Components

Courtesy of GENERAL MOTORS CORP.

## COMPONENT DISASSEMBLY & REASSEMBLY

### MAINSHAFT

#### Disassembly

1. Remove 5th countergear from countershaft. Remove and discard speed sensor rotor. Remove snap ring from output shaft. Using gear puller adapter and puller, remove output shaft bearing from output shaft. Remove 5th gear from output shaft.
2. Remove snap ring, 5th-reverse synchronizer assembly, synchronizer rings and reverse gear from output shaft. See **Fig. 4**. Scribe marks on hub and sleeve for installation reference.

**NOTE:** Leave synchronizer rings on all synchronizer assemblies to prevent synchronizer detent balls from popping out.

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3. Remove input shaft and pilot bearing from output shaft. Remove snap ring. Remove 3rd-4th synchronizer assembly and 3rd gear using hydraulic press. Remove retainer ring, pin and 2-piece thrust washer. Remove 2nd gear and inner and middle cones from output shaft. Remove snap ring. Using gear and bearing separator plate and hydraulic press, remove 1st gear and 1st-2nd synchronizer assembly with inner and middle cones from output shaft. Scribe marks on hub and sleeve for installation reference.
4. Place 1st-2nd, 3rd-4th and 5th-reverse gear synchronizers in separate shop towels. Wrap assemblies and press against inner hub. Disassemble synchronizer assemblies. DO NOT mix parts.

### Cleaning & Inspection

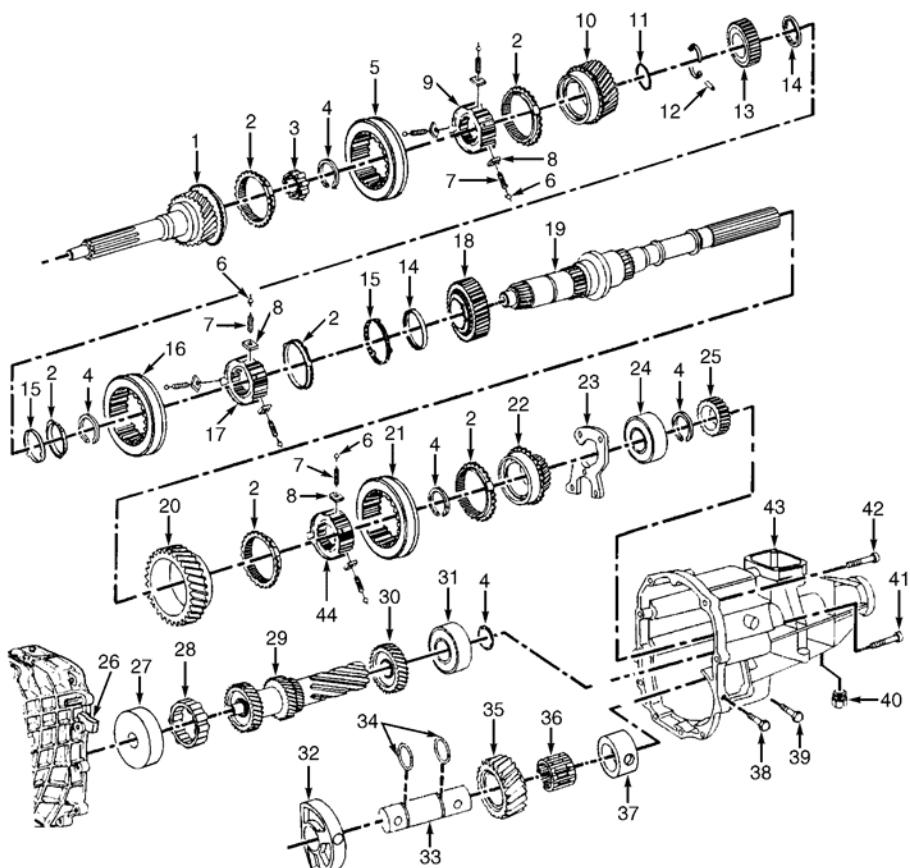
1. Wash all parts in solvent and air dry. DO NOT spin dry bearings. Check gears and synchronizers for cracks, chipped teeth, excess wear and other damage.
2. Check bearings and bearing surfaces for nicks, burrs, bent cages and wear. Lubricate all bearings and check for rough rotation. Lubricate all components during reassembly.

### Reassembly

1. Assemble 1st-2nd, 3rd-4th and 5th-reverse gear synchronizer assemblies. Synchronizer sleeves must be assembled with offset teeth toward 2nd, 3rd and 5th gear. Install 1st-2nd synchronizer sleeve with groove facing 1st gear. Install 3rd-4th synchronizer sleeve with 2 grooves facing 3rd gear. Install 5th-reverse synchronizer sleeve with 2 grooves facing 5th gear and one groove facing reverse gear.
2. Install reverse gear on output shaft. Check hub and sleeve scribe marks for correct position. Align and engage splines of 5th-reverse synchronizer assembly and output shaft. See **Fig. 4**.
3. Using press tube, reducer, separator plate and hydraulic press, press 5th-reverse synchronizer assembly with synchronizer ring onto output shaft until seated. Install NEW snap ring. Install 5th gear and bearing assembly on output shaft. Install NEW snap ring. Position NEW speed sensor rotor on output shaft 2" from bearing assembly.
4. Align and engage splines of 1st-2nd synchronizer assembly and output shaft. Using press tube, reducer, separator plate and hydraulic press, press 1st-2nd synchronizer assembly with both synchronizer rings onto output shaft. Check hub and sleeve scribe marks for correct position.
5. Stop press before tangs engage. Lift and rotate 1st gear to engage synchronizer ring. Continue to press until synchronizer assembly is seated. Install NEW snap ring. Install middle and inner cone, and 2nd gear. Install 2-piece thrust washer and pin with NEW retainer ring. Install 3rd gear. Align and engage splines of 3rd-4th synchronizer assembly and output shaft.
6. Using press tube, reducer, separator plate and hydraulic press, press 3rd-4th synchronizer assembly with both synchronizer rings onto output shaft. Stop press before tangs engage. Lift and rotate 3rd gear to engage synchronizer ring. Continue to press until synchronizer assembly is seated. Install NEW snap ring.

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1. Input Shaft
2. Synchronizer Ring
3. Pilot Bearing
4. Snap Ring
5. 3-4 Synchronizer Sleeve
6. Synchronizer Detent Ball
7. Synchronizer Detent Spring
8. Synchronizer Key
9. 3-4 Synchronizer Hub
10. 3rd Gear
11. Retainer Ring
12. Thrust Washer & Pin (3-Piece)
13. 2nd Gear
14. Inner Cone

15. Middle Cone
16. 1-2 Synchronizer Sleeve
17. 1-2 Synchronizer Hub
18. 1st Gear
19. Output Shaft
20. Reverse Gear
21. 5th-Reverse Synchronizer Sleeve
22. 5th Gear
23. Output Shaft Bearing Retainer Plate
24. Output Shaft Bearing Assembly
25. Speed Sensor Rotor
26. Front Housing
27. Bearing Shell
28. Roller Bearing
29. Countershaft
30. 5th Countergear
31. Bearing
32. Idler Shaft Support
33. Reverse Idler Shaft
34. "O" Rings
35. Reverse Idler Gear
36. Needle Bearing
37. Idler Shaft Support Collar
38. Support Bolt
39. Collar Bolt
40. Oil Drain Plug
41. Bearing Retainer Bolt (5)
42. Housing Bolt (9)
43. Rear Housing
44. 5th-Reverse Synchronizer Hub

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**Fig. 4: Exploded View Of Transmission Components**  
Courtesy of GENERAL MOTORS CORP.

## REVERSE IDLER GEAR

### Disassembly & Reassembly

Remove reverse idler shaft support, gear, bearing assembly and collar. Remove 2 "O" rings from reverse idler shaft. See **Fig. 4**. Clean all parts in solvent and air dry. Check gear teeth, bearing assembly and idler shaft for damage. Replace as necessary. To reassemble, reverse disassembly procedure. Lubricate all components during reassembly.

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### FRONT HOUSING ASSEMBLY

#### Disassembly

Press out input shaft bearing from front housing using press tube, reducer and hydraulic press. Remove front housing shift rail bushing with shift rail bushing remover and slide hammer with pilot bearing puller. Remove breather assembly. See [Fig. 3](#). DO NOT remove metal tube from case. Remove oil fill plug.

#### Cleaning & Inspection

Remove gasket material from case with liquid gasket remover. Clean all parts in solvent and air dry. Inspect all parts for damage, wear and cracks. Check mating surfaces for flatness. If scratches, grooves or scoring cannot be removed, replace component.

#### Reassembly

Press in input shaft bearing using press tube, reducer and hydraulic press. Install front housing shift rail bushing flush to housing, and stake bushing using bushing installer. DO NOT stake tabs on bushing. Install breather assembly. Apply sealant to threads of oil fill plug and install plug. See [Fig. 3](#).

### REAR HOUSING ASSEMBLY

#### Disassembly

Remove snap ring and shift rail support. Remove rear housing shift rail bushing using slide hammer. See [Fig. 3](#). Remove oil drain plug. Remove oil seal.

#### Cleaning & Inspection

Remove gasket material from case with liquid gasket remover. Wash parts in solvent and air dry. Inspect bushing for scores, burrs, roundness or evidence of overheating. Check extension bushing for wear or damage. Replace as necessary. Using straightedge, check machined mating surfaces for flatness.

#### Reassembly

Install rear housing shift rail bushing with writing on bushing lip facing down and flush in bore. Install shift rail support and snap ring. Install oil seal using oil seal installer. Fill seal lips with chassis grease. Apply sealant around edge of plug, and install oil drain plug.

### TRANSMISSION REASSEMBLY

1. Install pilot bearing on input shaft with smaller diameter of bearing cage facing toward input shaft. Retain bearing on shaft with petroleum jelly. Install input shaft and pilot bearing on output shaft. Turn mainshaft over and position on Assembly Pallet (J-41663). See [Fig. 5](#). Install 5th countergear on countershaft. Press countershaft rear bearing onto countershaft. Install NEW snap ring on countershaft. Position countershaft on assembly pallet.
2. Install 2 "O" rings onto reverse idler shaft. Install shaft support, needle bearing, reverse idler gear and

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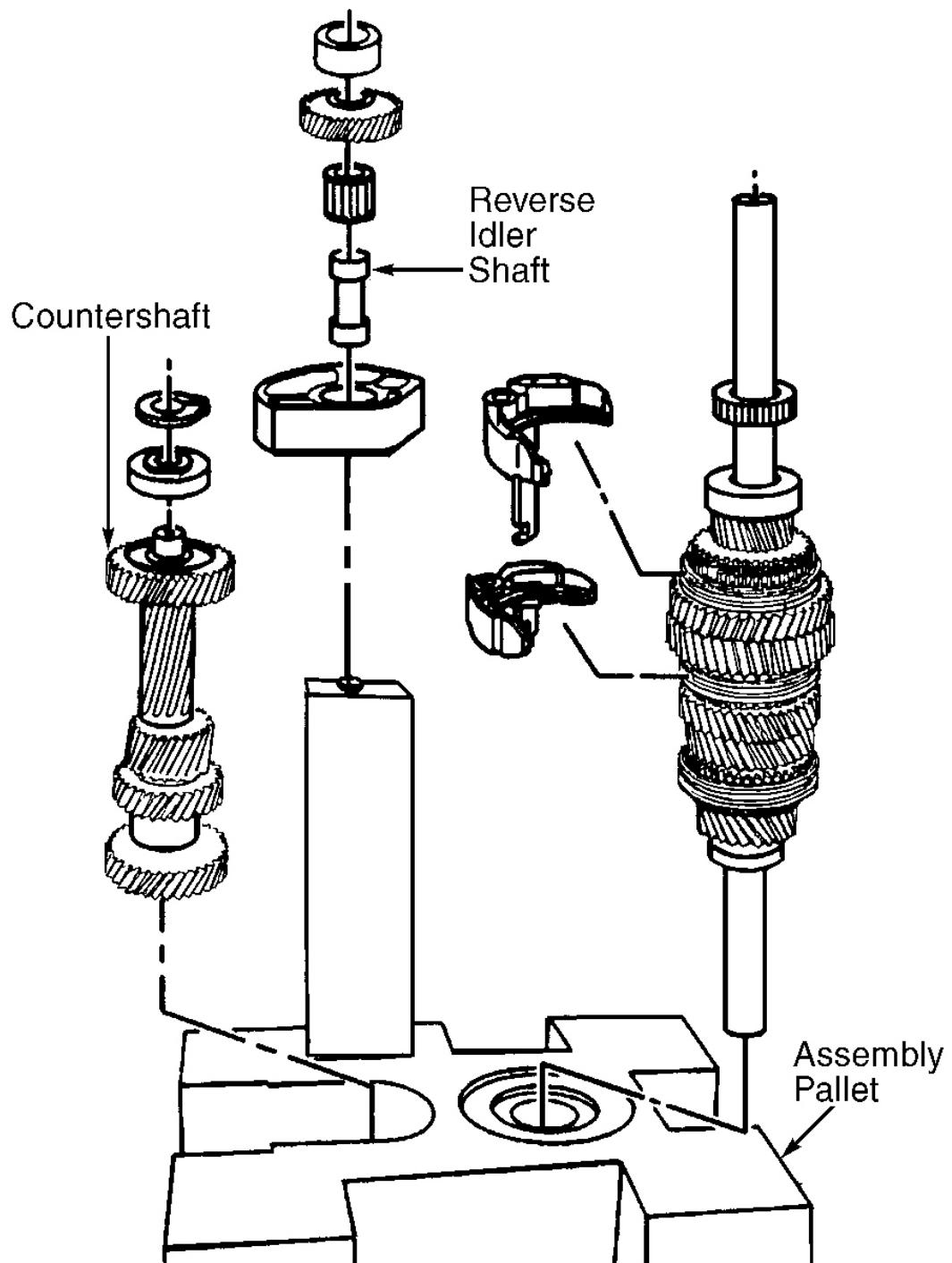
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idler shaft support collar on reverse idler shaft. See [Fig. 4](#). Ensure chamfer on idler shaft support and collar are facing up toward rear of transmission. Ensure groove on idler gear is facing collar.

3. Install reverse idler shaft assembly onto assembly pallet. Install output shaft bearing retainer onto mainshaft and countershaft. Ensure output shaft bearing retainer is positioned properly. Retainer should be positioned with hooked end under and behind mainshaft bearing, and forked end under and behind countershaft bearing. Install 5th-reverse shift fork onto 1st-2nd shift fork.
4. Install fork assemblies onto 1st-2nd and 5th-reverse synchronizer sleeves. Install rear housing over mainshaft, countershaft and reverse idler shaft assembly. Ensure reverse idler shaft assembly is lined up with holes in rear housing. Install 2 bolts securing reverse idler shaft assembly to rear housing. Short bolt goes in idler shaft assembly front hole. See [Fig. 4](#). Tighten bolts to specification. See [\*\*TORQUE SPECIFICATIONS\*\*](#).
5. Install 5 output shaft bearing retainer bolts. Tighten bolts to specification in a crisscross pattern starting at bottom bolt located at 7 o'clock position. Tighten bolt above 5 o'clock position last. Remove rear housing assembly from assembly pallet and position horizontal. Install 3rd-4th shift fork onto 3rd-4th synchronizer sleeve.

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Fig. 5: Positioning Components On Assembly Pallet

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6. Install shift rail into 3rd-4th shift fork. Install shift lever and block-out bushing onto shift rail. Install shift rail through 1st-2nd and 5th-reverse shift forks. Install shift rail socket on shift rail. See [Fig. 3](#). Slide shift rail into rear housing.
7. Install NEW 22 mm roll pin into shift lever until pin is flush with shift lever. Install shift rail socket to shift rail 30 mm roll pin. See [Fig. 3](#). Drive in roll pin until it is flush with bottom of shift rail socket. Install detent spring and plunger into shift lever. Shift transmission into 3rd gear by pushing shift rail all the way to rear of rear housing. Apply Loctite 518 sealant to mating surfaces of rear housing.
8. Install input shaft bearing into front housing using press tube, reducer and hydraulic press. Install bearing shell and countershaft roller bearing into front housing with smaller diameter of bearing cage facing housing. Retain with petroleum jelly. Install front housing onto rear housing.
9. Install block-out bushing pin into top of front housing and tighten to specification. Ensure pin installs into shift lever and shift rail bushing. Install 9 bolts securing front housing to rear housing. Tighten bolts to specification. Install shift rail detent plunger, detent spring and plug.
10. Install snap ring on input shaft bearing. Install silicone sealant to input shaft bearing retainer mating surface. Install retainer to transmission. Install 5 retainer bolts and tighten to specification. Install back-up light assembly into rear housing and tighten to specification. Install shift housing.

## TORQUE SPECIFICATIONS

### TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Block-Out Bushing Pin	24 (33)
Back-Up Light Switch	28 (38)
Drive Shaft Bolts	15 (20)
Front-To-Rear Housing Bolt	24 (33)
Idler Shaft Support Bolt	
Front	33 (45)
Rear	16 (22)
Input Shaft Retainer Bolt	21 (29)
Oil Drain Plug	27 (37)
Oil Fill Plug	17 (23)
Output Shaft Bearing Retainer Bolt	16 (22)
Transmission-To-Engine Bolt	35 (47)
Vehicle Speed Sensor Bolt	16 (22)
	INCH Lbs. (N.m)
Shift Lever Housing Assembly Bolt	89 (10)